

REMARKS

As recited in new Claim 21, the present invention is an organic electroluminescent device, comprising: an anode; a cathode; and a polymer luminescent layer disposed between the anode and the cathode, and comprising a host molecule and a luminescent dye molecule, the host molecule being formed of a π -electron conjugated polymer having a phenylene skeleton or a fluorene skeleton in a main chain thereof and having a fluorine atom bonded to a carbon atom in a π -electron conjugated system or a fluorine atom bonded to a carbon atom adjacent to a carbon atom in a π -electron conjugated system, and the luminescent dye molecule being selected from the group consisting of a transition metal complex and a linear π -electron conjugated molecule.

In the present invention, the above-recited combination of host molecule and luminescent dye molecule can utilize the energy of the host molecules in excited singlet states and the energy of those in excited triplet states efficiently, which improves luminous efficiency. Such a result cannot be obtained from the disclosures or suggestions of the applied prior art.

The rejections under 35 U.S.C. § 103(a) of Claims 2-4, 8-13 and 17-19 as unpatentable over U.S. 6,414,104 (Pei) alone, and of Claims 2-4, 6-13 and 15-19 as unpatentable over Pei in view of Baldo et al, *Nature*, vol. 395, pp. 151-54 (1998) (Baldo et al), are respectfully traversed.

Pei discloses conjugated polymers comprised of aryl amine-substituted poly(arylene vinylenes) as semiconductive materials in EL devices, and that the polymers may optionally be combined with an admixer, typically a compound selected such that charge and/or energy transfer takes place between the admixer and the polymer when a voltage is applied across the composition, such as a second conjugated polymer, phosphorescent dyes described in Baldo et al, among other compounds (column 17, lines 1-30).

While the Examiner recognizes that Pei does not describe a host molecule formed of a π -electron conjugated polymer having a phenylene skeleton or a fluorene skeleton in a main chain thereof and having a fluorine atom bonded to a carbon atom in a π -electron conjugated system or a fluorine atom bonded to a carbon atom adjacent to a carbon atom in a π -electron conjugated system, the Examiner finds that such a host molecule would be obvious in view of Pei's disclosure that R_2 and/or R_3 may be halo and that R_4 and/or R_5 may be halo-substituted alkyl or halo-substituted phenyl.

The Examiner finds the above-referenced disclosure in Pei regarding optional second conjugated polymer compounds suggests the presently-recited linear π -electron conjugated molecule and the above-referenced disclosure in Pei regarding Baldo et al's compounds suggests the presently-recited transition metal complex.

In reply, Pei's disclosure of their inventive conjugated polymer is inclusive of thousands, if not more, of possible compounds. It is only with the present disclosure as a guide that one skilled in the art would choose a host molecule having the presently-recited structure. In addition, the specification herein demonstrates the importance of the carbon-fluorine bond, compared to an analogous compound containing carbon-hydrogen bonds. Compare Example 1, described in the specification beginning at page 25, line 13, with Comparative Example 1, described in the specification beginning at page 26, line 26. As described in the specification at page 27, lines 11-14, the device of Comparative Example 1 shows lower luminance compared with that in Example 1, even though the driving voltage is increased.

Not only is the presently-recited host molecule not obvious over Pei, but the presently-recited combination of a host molecule and a luminescent dye material would not have been obvious either. Again, it is only with the present disclosure as a guide that one skilled in the art would make this combination.

For all the above reasons, it is respectfully requested that these rejections be withdrawn.

The rejection of Claims 2-8, 11-17 and 20 under 35 U.S.C. § 103(a) as unpatentable over U.S. 5,663,573 (Epstein et al) in view of U.S. 6,495,273 (Hwang et al), is respectfully traversed.

Epstein et al discloses a bipolar EL organic material device comprising, *inter alia*, a light emitter operating in both a forward and a reverse current direction and comprising an EL organic light emitting means in contact with an insulating means (paragraph bridging columns 2 and 3). As noted by the Examiner, Epstein et al discloses that their EL organic light-emitting material can be chosen from a wide variety of organic light-emitting materials including both molecular and polymeric light-emitting materials (column 5, line 56ff). Epstein et al then list a wide variety of such materials.

Hwang et al discloses a blue light-emitting polymer prepared from a particular fluorinated tetraphenyl derivative as a monomer (column 4, line 10ff). Hwang et al further discloses that it is considered that the electron affinity of their light-emitting polymer "comes from the fluorine substituents" (column 4, lines 24-25).

The Examiner holds that it would have been obvious to use the light-emitting polymer of Hwang et al as a light-emitting material in Epstein et al, and to use this light-emitting polymer with other light-emitting materials disclosed by Epstein et al, which the Examiner finds is inclusive of the luminescent dye molecules recited herein.

In reply, it is only with the present disclosure as a guide that one skilled in the art would combine the particular light-emitting polymer of Hwang et al with a luminescent dye molecule selected from the group consisting of a transition metal complex and a linear π -electron conjugated molecule. Indeed, the disclosure of Epstein et al is so broad as to literally encompass thousands, if not millions, of possible combinations.

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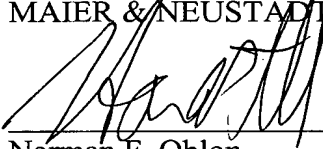
For all the above reasons, it is respectfully requested that this rejection be withdrawn.

The rejections of Claim 1 under 35 U.S.C. § 112, first paragraph, and of Claims 2-20 under 35 U.S.C. § 112, second paragraph, are respectfully traversed. Indeed, the rejections are now moot in view of the above-discussed amendment. Accordingly, it is respectfully requested that they be withdrawn.

All of the presently pending claims in this application are now believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

Respectfully submitted,

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